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ABSTRACT

This paper is part of a series presented at the symposium on a European units/credits system for modern language learning to adults. Included are a list of 58 modules or units of study, together with some indication of real-life situations in which the skills associated with the modules could be used. These modules have to be further divided so that a greater freedom of choice can be given to users with more particular needs and interests. As an aid to the establishment and justification of the modules of the units/credits system, a mathematical model is being developed. The modules presented in this report are a selection of those that can be derived from the model. Also included here are a model for the comprehension of unclear utterances, minimal skills of a foreign language copy-typist, a representation of conversation, and a general outlook for further work. (Author)

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COMMITTEE FOR OUT-OF-SCHOOL EDUCATION
AND CULTURAL DEVELOPMENT

A European units/credits system for
modern language learning by adults

The input-output relation in language behaviour
(State of 6 March 1973)

Paper submitted by Dr. Bung

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1. Introduction

1 This is a brief and informal account of some of the work done between 25 January and 6 March 1973. In particular, I present a list of 58 modules, together with some indication of real-life situations in which the skills associated with the modules could be used. These modules have to be further subdivided (i.e. to be broken into constituent modules) so that a greater freedom of choice can be given to users with more particular needs and interests.

2 As an aid to the establishment and justification of the modules of the units-credits system, a mathematical model is being developed. The modules presented in this report are a selection of those that can be derived from the model. The model itself will not be discussed in this report and most technicalities associated with it will be by-passed here. However, I wish to make it clear why any time should be spent on developing a mathematical model and on making it as elegant as possible.

3 The use of a mathematical model helps us

1. to "avoid precipitancy and prejudice";

2. to divide our exceedingly complex problems into parts small enough to be soluble and to synthesise them once a solution has been found;

3. to be exhaustive in our enumerations;

4. to provide a system which is general and flexible enough to accommodate unforeseen phenomena and requirements, thus making the units-credits system more acceptable to future users or future researchers trying to develop corresponding systems for different languages;

5. if the model turns out to be elegant, we have some indication that our analysis makes the critical distinctions, rather than trivial ones;

6. the significant similarities of seemingly different processes can be shown as well as their differences;

7. we produce a system which does not merely reflect one of the many changing fads and fashions in the field of language teaching but may have some lasting value.

(The observant reader may recognise Points 1 to 3 as paraphrases of the Cartesian principles of scientific method)

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2. The categories of a partial analysis

§ 4 Most language tests simulate, at some level of abstraction, real-life situations of verbal behaviour. These situations can, for instance, be of the following types:

1. The speaker conceives of a meaning that he wishes to express.
2. He hears or reads an expression whose meaning he has to ascertain.
3. He gets a message in one language and passes it on in another.
4. He describes a non-verbal event.
5. He receives a message and responds by producing a non-verbal event.

§ 5 The messages, received or transmitted, can be encoded in different ways. The following list is not exhaustive and can easily be extended. It exhibits an approach to analysis.

§ 6 A message may be in acoustic or graphic form. Acoustic messages may occur in different accents, native or non-native. The native accents may be associated with national territories (e.g. general British standard, or USA) or with parts of national territories, e.g. Yorkshire. The non-native accents can be divided into smaller or larger categories. Examples for large categories are Indian or African accents of English. An example for a small category is a Spanish accent of English.

§ 7 The graphic representations of messages may be handwritten or not. We call the non-handwritten messages "machine script". This concept subsumes "typescript" (produced on a typewriter) and "print" (produced on a typesetting machine). The handwritten messages may be in various types of shorthand or longhand. We have, at least for the time being, ignored other types of encoding, e.g. braille, morse, alphabetical flag signals, etc. We have approached shorthand as a form of phonemic transcription and ignored other shorthand systems (e.g. Speedhand).

§ 8 All representations of messages except "machine script" may come in different degrees of "clarity", i.e. handwriting may be more or less legible, speech more or less clearly articulated, differing in speed and accompanied by different amounts of noise. We have selected two extremes on the "scale of clarity" and labelled them "clear" and "unclear".

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§ 9 We assume, in agreement with, for instance, Trim 1969, that there is a "linguistic form" underlying any observable utterance and that this is, at least partly, perceived before a message is understood and that it is, at least partly, generated in the speaker's or writer's mind before an utterance is made. (More about this process below).

§ 10 We distinguish between "source language" and "target language", the latter being the language to be learnt or examined. The source language is often the candidate's native language but may also be the language of the country in which the examination takes place. Its essential characteristic for our purposes is that it is supposed to be known by the candidate and that his knowledge of the source language is not intentionally tested. It functions, at best, as an aid to learning or examining.

§ 11 We can now list the basic categories mentioned above and show how they are interrelated. Each category is denoted by a number.

§ 12 Categories distinguished in the target language

1 Set of all utterances
2 " graphic utterances
3 " acoustic utterances
4 " machine script utterances
5 " manuscript utterances
6 " typed utterances
7 " printed utterances
8 " shorthand utterances
9 " longhand utterances
10 " native accent utterances
11 " non-native accent utterances
12 " British standard accent utterances
13 " Yorkshire accent utterances
14 " general US accent utterances
15 " Indian accent utterances
16 " African accent utterances
17 " Spanish accent utterances

§ 13 Language independent category

18 Set of all meanings

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§ 14 Categories distinguished in the source language
(cf. corresponding categories of target language)

19 all utterances
20 acoustic utterances
21 graphic utterances
22 machine script
23 manuscript
24 shorthand
25 longhand
26 typescript
27 print

§ 15 Categories of unuttered formulations

28 Set of all linguistic forms in target language
29 Set of all linguistic forms in source language

§ 16 Extra-linguistic category

30 Set of all non-verbal events

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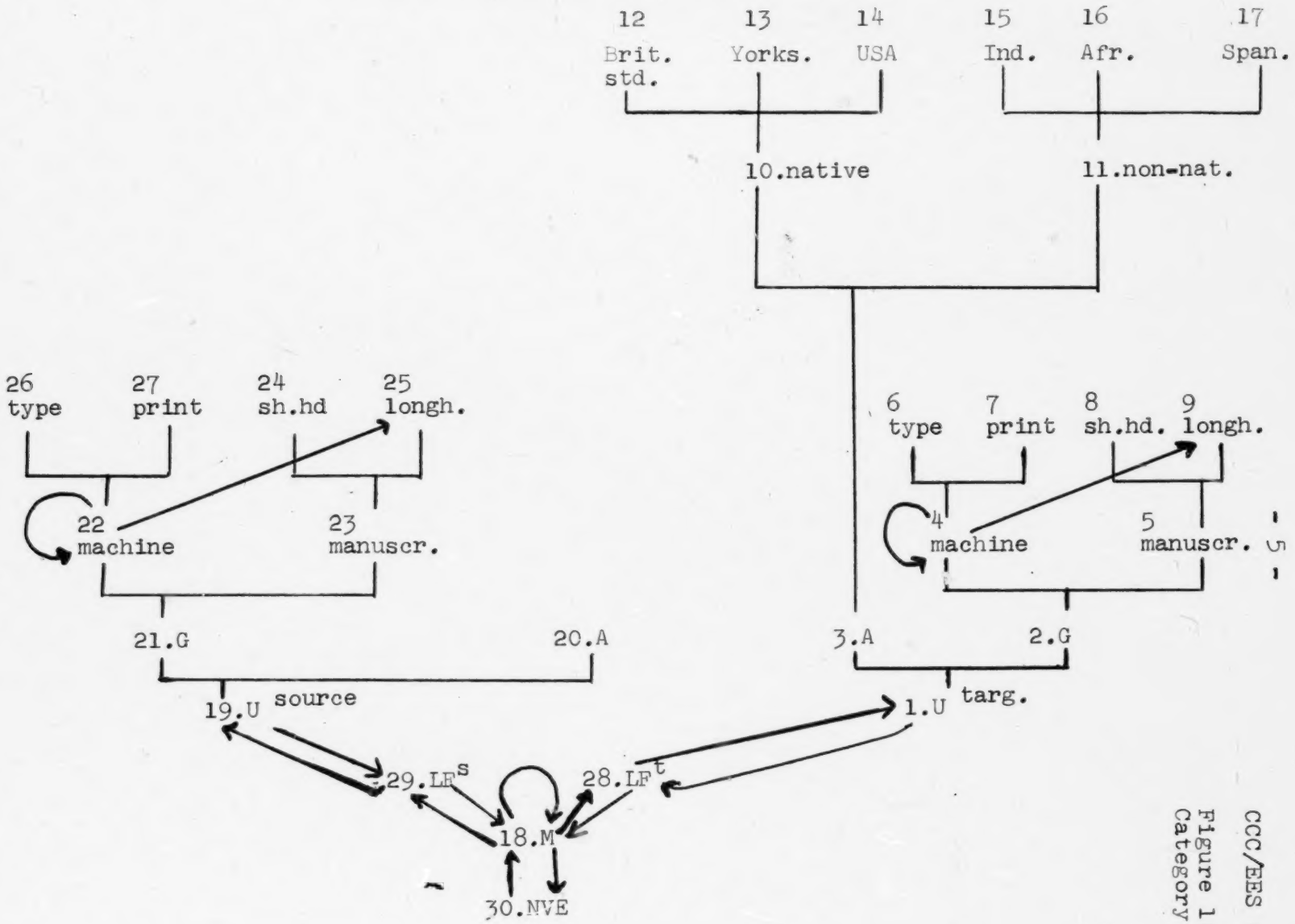

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Figure 1:
Category set, C

3. Introduction to list of modules

§ 17 The categories of Figure 1 enable us to describe language activities by means of ordered sets of numbers, called "vectors" in accordance with established mathematical practice (e.g. Mangoldt 1965, Kelley 1960, Ashby 1964).

§ 18 The arrows in Figure 1 impose constraints on the permissible sequences of numbers in these vectors. Their precise definition is a technical matter and will be omitted here because we are primarily interested in the results achieved, i.e. the modules generated within these constraints. The lines without arrow-heads in Figure 1 connect each set to its subsets, the subsets being, on paper, above their supersets. Within the hierarchies of subsets, higher levels of resolution (Klír and Valach 1967) appear on paper above the lower levels of resolution. The number zero in some of the vectors is a technical device which can also be ignored here.

§ 19 If we had listed all vectors (i.e. all language activities) that are compatible with, and can be distinguished through, the categories of Figure 1, we would have obtained over 600. This is the effect of working at the highest level of resolution of that diagram. Since some of the terminal elements of Figure 1 (namely 6-9, 12-17, 24-27) can be further subdivided, even further modules can be distinguished within this system, quite apart from the fact that different types of criteria can and will be used to create further worthwhile distinctions.

§ 20 To reduce the number of modules somewhat, we have specified most modules at a lower level of resolution, namely at the level specified by the following categories: 21, 20, 29, 18, 28, 3, 2. Only some "mechanical copying activities", which can be learnt and carried out without any understanding of the meaning of the message, have been specified at a higher level of resolution.

§ 21 We now give a list of vectors with brief notes about real-life activities which they simulate. As far as they have observable outputs (which is true of most), they constitute potential modules. It should be noted that the proposed modules can and will be further subdivided, e.g. in respect of different types of subject matter and that additional modules can be created.

§ 22 Basically the vectors (strings of numbers) are to be read as follows: the learner is given a text (spoken or written) or a non-verbal event denoted by the first number of the vector. He converts that text into another text or into a non-verbal event denoted by the last number of the vector. Any numbers between the first and the last number

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(except zeros, which can be ignored) indicate, in order from left to right, intermediate steps the learner must take in carrying out his task, e.g. perceive the underlying linguistic form, determine the meaning, generate another linguistic form, etc.

§ 23 Some of these intermediate processes will be discussed in more detail below.

§ 24 The commas which usually separate the components of a vector have here been replaced by spaces.

§ 25 Any vector which contains the number 18 twice in succession is one in which the learner has to modify the meaning of the given text, e.g. by expanding it or reducing it.

§ 26 The testing of comprehension and the different modules that can be associated with different testing techniques are only partially covered in the following list. Assuming that in a test a student received a complex "input" consisting of

- a text or a picture (etc.)
- sometimes a set of questions
- an instruction telling him what to do with the text and assuming further that any part of this kind of input can come in a variety of modes as allowed for in Figure 1, then the process of understanding any part of this input can be described by a vector ending with the number 18. The vectors listed below can be regarded as representing the abstract content of the instruction part of the above kind of input. These considerations, which occurred only very recently, will yet have to be accounted for in the technical report I am preparing and are therefore not yet reflected in this informal report.

§ 27 4. List of modules

Activities which can be carried out without reference to meaning, modules being specified at highest level of resolution

Note: This column contains only examples, not a precise description of the modules. It has to be read in conjunction with the corresponding vectors on the left.

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Group 1: Target into target

6	0	0	0	0	6	copytyping
6	0	0	0	0	7	foreign language printing
6	0	0	0	0	9	e.g. research assistant copying quotations
7	0	0	0	0	6	copytyping
7	0	0	0	0	7	foreign language printing
7	0	0	0	0	9	e.g. research assistant copying quotations

More complex activities, specified at resolution level (21, 20, 29, 18, 28, 3, 2)

Group 2: Meaning into target

18	0	0	0	28	2	writing of essays, reports, letters
18	0	0	0	28	3	free speaking; dictating essays, reports, letters; active parts of conversation

Group 3: Target into target

2	0	28	18	28	2	all kinds of copying and printing; same code into same or different
2	0	28	18	28	3	reading out aloud from all kinds of graphic code into all kinds of accents; including reading for the blind, transmitting written text over telephone ...
3	0	28	18	28	3	repeating spoken utterances, "translating" from one dialect into another
3	0	28	18	28	2	writing or typing from dictation (including shorthand), including taking of messages over the telephone

Group 4: Target into target (with information reduction)

2	28	18	18	28	2	précis writing, preparing summaries of newspaper reports/letters etc.; getting the "gist" of written information
2	28	18	18	28	3	giving oral summary of written text, e.g. to top politicians, businessmen or blind persons of any kind; more important in country of target language
3	28	18	18	28	3	summarising speech, e.g. radio/TV reporter, including "translating" from one accent into another
3	28	18	18	28	2	preparing written summary of speech, e.g. newspaper reporter

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Note: Groups 5 and 6 may have the same content as Groups 3 and 4 but with "unclear" (or noisy) inputs; only some extra examples are listed below. The ~ before the first number in each line indicates that an unclear input is referred to.

Group 5: Target into target

~2	0	28	18	28	2	e.g. copying from bad handwritten script or typescript with handwritten corrections; including research assistant copying handwritten documents
~2	0	28	18	28	3	reading letters for the blind
~3	0	28	18	28	3	passing on spoken message in ship's engine room or aircraft's cockpit; passing on telephone message from noisy line
~3	0	28	18	28	2	writing or typing telephone messages, taking dictation from noisy dictating machine

Group 6: Target into target

~2	28	18	18	28	2	writing down the gist of handwritten letters
~2	28	18	18	28	3	giving oral summary of handwritten letters
~3	28	18	18	28	3	non-verbatim passing on of mumbled or fast-spoken order or of order given in noisy conditions
~3	28	18	18	28	2	writing down gist of such information; part-skill of "consecutive" interpreter

Group 7: Source into target

21	0	29	18	28	3	translating written text orally, e.g. content of business letters over the phone to anticipate written confirmation
21	0	29	18	28	2	preparing written translations, variety of topics: commercial, technical, literary
20	0	29	18	28	3	simultaneous or intermittent interpretation
20	0	29	18	28	2	written translation of spoken text; input may be on tape or dictating machine; including on-the-spot translation of business correspondence into typewriter or into shorthand

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Group 8: Source into target (with information reduction)

21	29	18	18	28	3	transmit gist of written text via foreign speech, e.g. tourist guide helping foreigner to understand a leaflet
21	29	18	18	28	2	writing summary of source language text into target language, e.g. "translation of gist" on margin of business letter so that action can be taken; this is most likely to be required in country of target language; the translator would then be a foreigner in that country
20	29	18	18	28	3	transmitting gist of spoken message orally, e.g. international telephone operator
20	29	18	18	28	2	composing a foreign letter of which only the approximate contents have been given orally in the source language

Group 9: Target into source

2	0	28	18	29	20	giving oral translation of foreign document, e.g. business letter or information for the blind
2	0	28	18	29	21	giving written translation of foreign document
3	0	28	18	29	20	oral translation of foreign speech; simultaneous interpretation
3	0	28	18	29	21	written translation of foreign speech, including taped message or telephone conversation

Group 10: Target into source (with reduced information)

2	28	18	18	29	20	orally giving gist of foreign document, e.g. business letter for immediate action or information for the blind
2	28	18	18	29	21	giving gist of foreign document in writing, e.g. notes on margin of business letters
3	28	18	18	29	20	giving oral summary of foreign speech, especially intermittent interpretation
3	28	18	18	29	21	writing summary of foreign speech, including tapes of speeches and telephone conversations

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Note: Groups 11 and 12 correspond to Groups 9 and 10 above but differ by having unclear inputs

Group 11: Target into source

~ 2	0	28	18	29	20	handwritten or shorthand input
~ 2	0	28	18	29	21	handwritten or shorthand input
~ 3	0	28	18	29	20	input: fast speech, mumbled speech, speech in noisy environment: airplane, factory, ship
~ 3	0	28	18	29	21	as preceding vector

Group 12: Target into source

~ 2	28	18	18	29	20	)
~ 2	28	18	18	29	21	) Examples as Group 11, but unclear
~ 3	28	18	18	29	20	) inputs and giving gist only
~ 3	28	18	18	29	21	)

Group 13: Target into non-verbal event

2	0	0	28	18	30	ability to respond to printed/painted commands/warnings by acting or refraining from action (foreign workers); in tests: making a drawing, tracing movements on a geographical map, assembling an object,...
3	0	0	28	18	30	ditto: carefully spoken commands/ warnings

Group 14: Target into non-verbal event (with information reduction)

2	0	28	18	18	30	) as Group 13, but with highly redundant
3	0	28	18	18	30	) instructions, not every word of which is matched by an action

Group 15: Target into non-verbal event

~ 2	0	0	28	18	30	ability to act on handwritten commands/ warnings; foreign workers; including ticking off of multiple choice answers
~ 3	0	0	28	18	30	ditto: carelessly spoken commands/ warnings; factory/airport etc.,noise

Group 16: Target into non-verbal event (with reduced information)

~ 2	0	28	18	18	30	) Examples correspond to Group 14, but
~ 3	0	28	18	18	30	) input is unclear, as in Group 15

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Note: "Non-verbal event into target" is restricted to vectors with reduced information because no description of events is ever absolutely complete. Unclear inputs (e.g. events in mist or fog) are excluded from consideration because the ability to cope with this variation is not a specific result of language training.

Group 17: Non-verbal event into target

30	0	18	18	28	3	oral description of pictures; sports reporter; describing real events
30	0	18	18	28	2	written description of picture or real events

Group 18: Target into meaning (not observable)

1	28	0	0	0	18	e.g. silent reading; listening to radio, TV., theatre; receptive phases of conversation
1	28	0	0	18	18	ditto, with conscious information reduction (see Section 5)
~1	28	0	0	0	18)	as preceding two vectors, with unclear inputs
~1	28	0	0	18	18)	

5. A model for the comprehension of unclear utterances

§ 28 We interpret the process of comprehension as an indirect transformation (in the sense of Ashby 1964) of utterance into meaning. With each utterance, a set of meanings is associated, ranging from the "full meaning" to meanings "reduced" in varying degrees by the usual processes of abstraction. For simplicity's sake, we describe this model with reference to handwritten utterances. The model can also deal with spoken utterances but some adjustments would have to be made, due to the transitory nature of the signals.

§ 29 We assume that the reader of a handwritten letter wants to get a certain amount of meaning (information) out of it, in some cases the full meaning, in some cases a reduced meaning. A greater fraction of meaning obtained is not always preferable to a smaller fraction of meaning. When trying to obtain precisely the fraction of meaning required for a particular purpose, the reader may sometimes obtain it at first reading (i.e. understand no more and no less than the information and detail required). More often he will either understand more and have to reduce the amount of information by discarding irrelevant details or he may understand too little at first reading and will have to return to the text to obtain more details. Moreover, he

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may, at first, obtain a great deal of information but not from those parts of the message which are relevant to him. In brief, the reader has to search for the right amount and the right selection of information and to ensure its compatibility with the text, taking also into consideration other non-linguistic sources, such as his own prior knowledge, probabilities of certain events, intelligent guessing procedures (supported by parts of the text), etc.

§ 30 In addition, he has to be reasonably sure that he has achieved his goal in the three respects mentioned (right amount, right selection and compatibility). The degree of certainty required (in all three respects) varies in different circumstances and depends largely on the seriousness of the consequences of obtaining (and passing on or acting on) false information or too reduced information or too much information (e.g. failing an exam, causing a plane crash, causing serious losses on the stock exchange). It also depends on the time available for obtaining a greater degree of certainty.

§ 31 We assume that a reader knows more or less instinctively how much and which information he wants to obtain and how certain he wants to be that he has achieved his aim.

§ 32 Since the text may not be very readable, the reader often has to make a hypothesis about the linguistic form represented by the graphic signs. He then extracts the meaning of the hypothetical linguistic form or makes a hypothesis about a compatible meaning using extra-linguistic sources as well. If the amount of information obtained is too great, he can reduce it (this is a transition from 18 to 18). If the amount of information or his degree of certainty is not adequate, the reader uses the meaning obtained, together with his knowledge of the grammar of the target language, to reconstruct a linguistic form that expresses his hypothetical meaning (transition from 18 into 28) and compares the linguistic form with the given text (represented in our model by a transition from 28 into 1). The procedure sketched out here is presented in the form of a flowchart in Figure 2. Notation: Do (a,b) means that a transformation from a into b is to be carried out, i.e. an element of a is to be replaced by the corresponding element of b.

+ and - mean "true" and "false" respectively.

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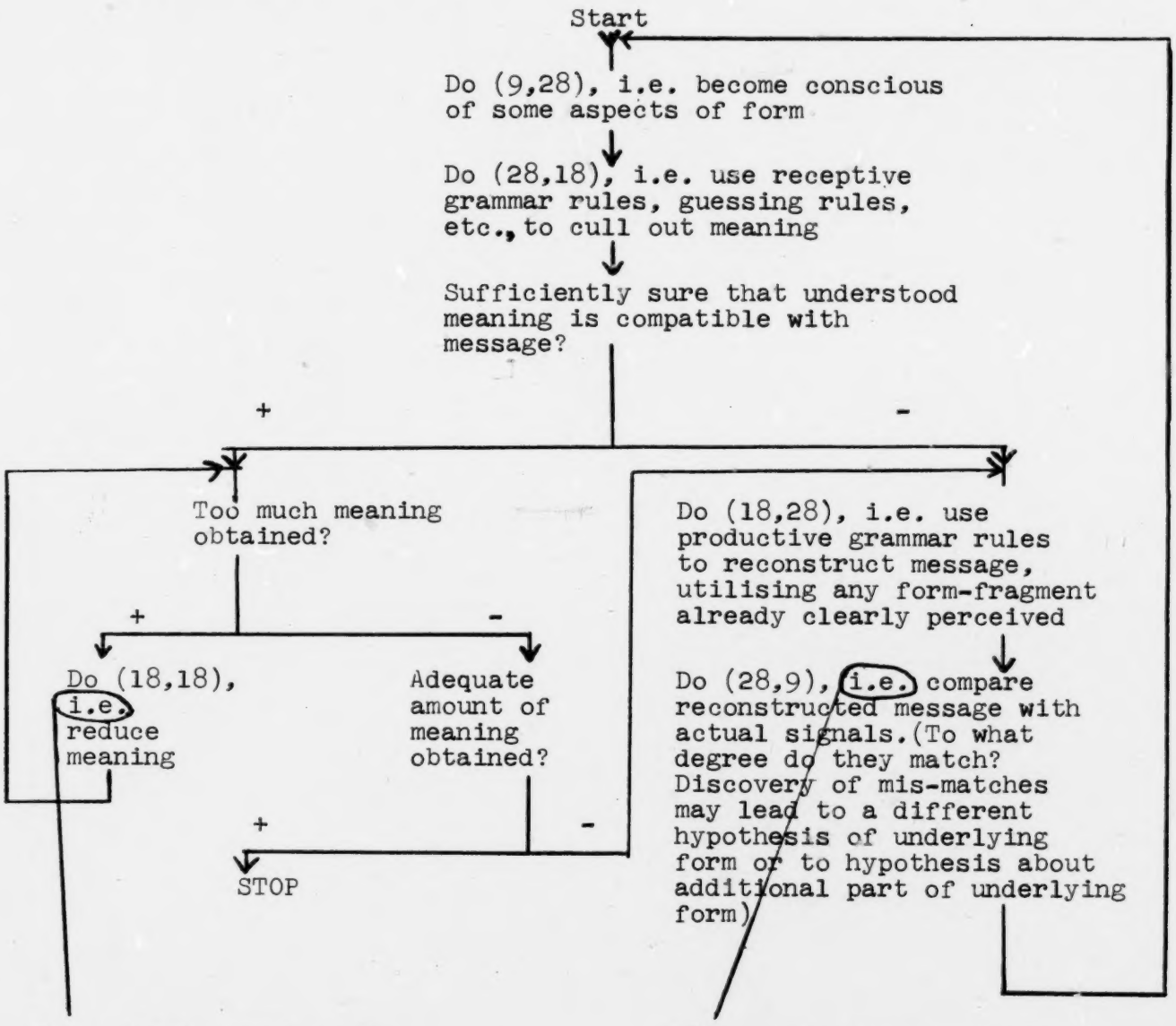
Figure 2

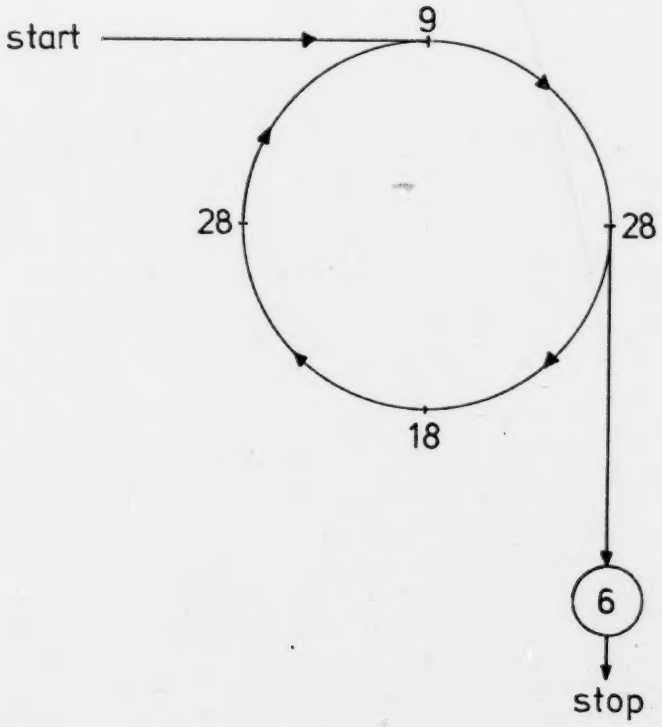

Start
Do (9,28), i.e. become conscious of some aspects of form
Do (28,18), i.e. use receptive grammar rules, guessing rules, etc., to cull out meaning
Sufficiently sure that understood meaning is compatible with message?
+
-
Too much meaning obtained?
+
-
Do (18,18), i.e. reduce meaning
Adequate amount of meaning obtained?
+
-
STOP
Do (18,28), i.e. use productive grammar rules to reconstruct message, utilising any form-fragment already clearly perceived
Do (28,9), i.e. compare reconstructed message with actual signals. (To what degree do they match? Discovery of mis-matches may lead to a different hypothesis of underlying form or to hypothesis about additional part of underlying form)

Note: This is the only reasonable interpretation of (18,18) here, since a transformation without change would be useless, if not meaningless, and meaning cannot be increased without reference back to 28 or even to 9

Note: For the purposes of comparison, 28 is transformed, at least "in the mind's eye", into a spelling representation. This is distinct from both 28 and from the physical substance of 9. However, it is so close to 9 that I allow 9 to take its place in this description

§ 33 This procedure describes such distinct activities as that of a copy typist trying to ascertain the exact wording of a badly written letter and that of an arbitrary person who only wants to get the 'gist' of a letter for his own benefit. The copy typist starts with 9 and ends up with 28, before proceeding to transform 28 into 6. The "reader-for-the-gist" starts with 9 and ends up with 18, and may then, if he wishes, take appropriate verbal or non-verbal action, including that of reporting his findings in some language or other

§ 34 The copy typist runs through the following cycle:



§ 35 The potentially cyclic processes described here underlie all modules with unclear inputs or information reduction. The vectors used for the representation of these modules abstract from the unlimited number of cycles permitted and show only the simplest case, i.e. that which occurs when the candidate happens to solve the task in a single transition through each component of the vector.

6. Minimal skills of a foreign language copy typist: Group 1, Vector (6,...,6)

§ 36 This seemingly peripheral module has been chosen as an example for more detailed discussion even though it may not be of the greatest practical importance. The reasons for this choice are the following:

1. At first sight, the skill corresponding to the module seems to be so simple that nothing except ability to type in the source language seems to be required and thus nothing to be learnt or examined. The falsity of this first impression makes this module interesting.

2. There are in fact a great many things to be learnt in this module but they are quite different from, and much easier than, the usual content of foreign language instruction and therefore illustrate clearly the kind of gain that can be expected from the ideology underlying the projected units-credits system.

§ 37 This module, as opposed to "Group 3, Vector 2,...,2", presupposes that the given copy does not contain handwritten corrections and is free of error (e.g. the typist does not have to put occasional "obvious" misspellings right). When being trained for this skill, the typist acquires an intuitive knowledge of the transition probabilities among letters and of likely letter clusters and thus physical readiness to execute them. Moreover, knowledge of certain basic spelling conventions can be helpful (e.g. capitalisation after certain punctuation marks).

§ 38 There may be formal rules for splitting words at the end of a line. If there are no formal rules, then it may at least be possible to find and teach rules which reduce the probability of error. Note that the teaching target is never error-free performance but consists of the reduction of the probability of error below a certain value that may vary in different situations. Therefore even false rules are acceptable provided they produce the desired effect.

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§ 39 If the rules for the splitting of words presuppose knowledge of the meaning of the language (and therefore go beyond the limits of this module), the typist can benefit from knowing which dictionaries clearly indicate potential splits in each word (e.g. Hornby's "Advanced Learner's Dictionary of Current English") and by understanding the relevant typographic conventions of such a book (e.g. formerly in Hornby a distinction between "-" for potential split and "=" for obligatory hyphen).

§ 40 Without such skills, the learner may have to avoid all splits. However, this strategy will not help in cases where a word has been split in the original copy but cannot be split in the second copy because it occurs, say, at the beginning of a line. Here, the typist must be able to determine whether the "-" in the original copy stands for a hyphen cum split-mark or only for a split-mark and accordingly copy or not copy it.

§ 41 This problem cannot be avoided by instructing the typist to make each of his lines identical in content with the given copy, since the original typewriter and the copying typewriter may have typefaces of different size (e.g. pica versus elite).

§ 42 The foreign language may have special signs which are not on the typewriter keyboard of the copy typist. Usually there are established conventions of substitute signs to be used in such cases. Sometimes the substitute signs are constructed by overtyping. Here are some examples: where a special sign for the digit "one" is not available, the first letter of "lovely" and not of "Isidora" is used as a substitute; thus: 1500, not I500. Where the dollar and cent signs and certain Scandinavian vowel letters are not available, the oblique stroke is used in conjunction with available letters to construct ø, ¢, ø etc. On the other hand, where the £ sign is not available, the accepted substitute is not ℒ (which I have seen in a Spanish publication) but ₤ (composed of L and =). The French cédille can be constructed by typing a comma over a "c", thus: ç. German umlauts can be constructed with the help of double quotation marks over lower case letters, e.g. ö is the quotation mark substitute for ö. But on capital letters, the quotation marks must be moved up by half a line so that we obtain Ö and not Ö for Ö. The German "es-zet" (ß) may in emergencies be replaced by ss or sz but not, as often happens, by B. In German typescript, "....." is acceptable even where the printed or handwritten original has „....."

§ 43 Ignorance of such devices is very widespread among typists and its eradication could greatly facilitate work not only in offices where straightforward foreign language copy typing has to be done but even in the much simpler situations where an office has to cope with a comparatively large number of foreign names, addresses, currencies and book titles while the

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correspondence itself is conducted in the typist's native language. In such cases it is hardly worthwhile to employ an expensive secretary with knowledge of foreign languages but a person with the skills described above would be highly desirable. (Note that the ability of transferring foreign addresses correctly from a letterhead to an envelope is also not a trivial matter, quite apart from the lettering problems discussed above.)

7. The representation of conversation

§ 44 We treat conversation in the view of any one partner as a sequence of alternating active and passive phases. The active phases of conversation are accounted for in Group 2, Vector (18,...,3), p. 8. The passive phases of conversation have so far not been assigned modules of their own since they end in 18 (perception of meaning) and their output is therefore not observable and examinable. However, transitions from 3 to 18 (representative of the passive phases of conversations) do occur as constituents of other modules to which observable outputs have been assigned, e.g. in Groups 3 to 6 and 9 to 14. A thorough study of the significant features of conversation tests will be made with a view to fitting a comprehensive conversational module into the system.

8. Outlook

§ 45 I shall now

1. clarify the relations between the learner, his native language, the source language, the target language, the language of the country in which he works, the language of the community in which he works, the language of the country in which he may be tested, etc.

2. clarify the relations between categories 18, 28, 29 and 30 in Figure 1 above.

3. consider activities where source language competence is also critical, e.g. translation "as an art".

4. systematise any classificatory criteria established during the above investigations and superimpose them on the potential examination elements presented in this report, with a view to obtaining more precisely defined modules.

5. assign subject matter content to the modules thus established in terms of the papers produced by van Ek and Wilkins.

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